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NIC Safe Mode
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Cost optimized servers restrictions

In many cases, the only connections to a server are:

1. Power connection
2. Network cable

Mandates server to always be remotely accessible and manageable
Cost-optimized server constraints

1. Standard platforms are not designed for device-specific customization
2. NIC in OCP cost-optimized server is a single-point-of-failure
   • Bad things happening to a NIC require self-healing method
A need for NIC Safe Mode

When badly-configured NIC prevents a server boot, alternatives are limited

1. Allow modifying bad-configuration via the BMC
   - Not all system settings which could cause such an issue are configurable from the BMC

2. Physically replace of the misconfigured NIC
   - The last resort in a large data center

3. Or....
Examples

276-Option Card Configuration Error. An option card is requesting more memory mapped I/O than is available.
Action: Remove the option card to allow the system to boot.

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Mellanox NIC Safe Mode benefits

• Needed when a bad configuration of devices prevents a system from starting
• Safe-Mode capability allows device recovery without having to remove it
• Safe-Mode entry is *Automatic*
Mellanox NIC Safe Mode description

• Supporting devices detect system reset which was not followed by a driver-start
• Upon a pre-configured number of bad reboot cycles, ConnectX device automatically enters Safe Mode
• Safe Mode can be enabled/disabled through non-volatile configuration
• Safe Mode can be enabled/disabled/monitored through HII, NC-SI and the OS using Mellanox tools
Mellanox NIC Safe Mode operation

- Device in Safe Mode requires minimal system resources to allow the system to start
- Once operating in Safe Mode, bad settings can be reviewed & modified by the user/operator
- Device operating in Safe Mode provides visibility to its operating mode through HII, Console and through Mellanox configuration tools

```
[root@qahp-104 ~]# dmesg | grep safe
mlx5_core 0000:04:00.0: 0000:04:00.0: mlx5_cmd_init_hca:230:(pid 2783): to allow operational configuration:
mlx5_core 0000:04:00.1: 0000:04:00.1: mlx5_cmd_init_hca:230:(pid 2837): to allow operational configuration:
```

- After reconfiguring the device to the correct settings, it will restart normally with the new settings on the next system reboot
Mellanox NIC Safe Mode configuration options

4 different operational modes are possible with Mellanox NIC Safe Mode

1. NIC Safe Mode is disabled
2. NIC Safe Mode is enabled after *Num-Bad-Reboots* (default mode)
3. NIC Safe Mode is activated once in the next reboot
4. NIC Safe Mode is enforced for any boot
   - Safe Mode default can be set to disabled/enabled, through non-volatile configuration
   - *Num-Bad-Reboots* parameter can be between 1-255 bad reboots
Call for action

• Request new NC-SI standard command to force NIC to reset to “factory default” mode
• When in “factory default” mode, a given device shall always allow re-configuration
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